IOWA FOREST PEST SURVEY

1990

IOWA DEPARTMENT OF NATURAL RESOURCES

DIVISION OF FORESTRY

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FOREST INSECT AND DISEASE INTERN

INTRODUCTION

Although the ash species is only a small component of the forest stands in Iowa, it is quite valuable as a pioneer species in reclaiming abandoned farm fields, in conservation reserve plantings (CRP), in the use of energy plantations, and especially as an urban or yard tree. These uses make the ash a very important species, even though it may not make up a very significant population in the forest stands of Iowa. Ash decline has been a recognized problem around the state for a number of years. In 1986 Dr. Wayne Sinclair verified the decline of ash as "ash yellows". With the visit of Dr. Sinclair to Iowa and other states in 1986, much interest has been placed on the research and collection of information on forest stands suspected of having ash yellows.

The ash yellows study this summer was a cooperative venture including Iowa, Wisconsin, Minnesota, Illinois, and Missouri. The survey was designed to do the following:

1. Determine the distribution of the mycoplasmalike organisms (MLO) causing the decline of ash stands.
2. Assess the health of ash and impact of ash yellows on ash stands.
3. Determine the distribution and incidence of other disease that may contribute to the decline of ash.
4. Establishment of permanent monitoring and impact plots.

The following report is the result of this summers: Ash yellows survey, aerial sketch map and detection flight survey, and field reports of various forest pests in Iowa.

ASH YELLOWS SURVEY

Ash yellows is caused by mycoplasmalike organisms (MLO), and has been associated with a serious decline of ash species in the northeastern states (Matteoni and Sinclair 1985). The series of symptoms begins when the mycoplasm infects the phloem of a tree. The first apparent symptom after infection has occured, is slow or subnormal growth. With the onset of slow growth, leaves often become chlorotic. Leaves may also become cupped or folded lengthwise so that they appear V-shaped in cross section, and they appear abnormally narrow when looking into the crown from the ground. Trees with the small or cupped leaves give the entire

crown a thinning appearance. As the dieback in a tree advances, the production of epicormic sprouts at the base of the tree, along the trunk, or limbs is common. These sprouts may become deliquescent, meaning that the terminal has lost dominance and the laterals are allowed to grow to an equal length. Deliquescent shoots will give rise to witches'-brooms as a dense cluster of shoots begins to grow. These brooms are commonly found near the base of the tree, but are occasionally found higher on the trunk. Leaves of the witches'-brooms tend to be chlorotic, dwarfed, narrower than normal, and simple rather than compound (Sinclair 1986). Frost cracks are another symptom commonly found at the base of an infected tree. The frost cracks are a result from freezing damage to the vascular cambium.

The survey needed a minimum of twenty forest stands to be sampled throughout the state. Of these twenty stands, ten stands sampled were to be white ash (*Fraxinus americana*) and ten were to be green ash (*Fraxinus pennsylvanica*). At least one sample was located in each of the state forests and forest districts except district 3 because of flooding in desired sample areas.

At each location, data was collected from at least ten ash trees per stand. Each of the ten ash trees were located by horizontal line sampling and were then evaluated. The trees were evaluated for the symptoms typical of ash yellows and other diseases. In addition , each ash tree was rated for branch dieback and crown transparency. Crown transparency was rated using a computer generated chart showing various percentage classes of available crown. This crown transparency chart is shown in Figure 1, on page 8.

Specimens were then collected from three of the ten ash trees evaluated in the sample. The three trees to be used in the specimen collection were to be the most symptomatic and likely to be infected with ash yellows. Two living roots per tree were to be sampled each on opposite sides of the tree. The root specimens were to be approximately 6 mm in diameter (size of a pencil),and 1 cm in length. The root specimens were obtained by following a lateral root out from the base of sample tree until the desired root size was found. Specimens were then preserved in a tissue fixing solution and sent to Cornell University in Ithaca New York for testing and positive identification. Results of the ash study should be completed and published in February 1991.

The ash yellows disease appears to be found in greater numbers in the eastern side of the state. Although the disease appears to be more common in eastern Iowa, the symptoms of ash yellows were commonly seen throughout the entire state. This is probably due to the fact that eastern Iowa has more forested areas than any other parts of the state. Another influencing factor is that white ash is found in greater numbers in eastern Iowa. The areas sampled during the ash yellows survey are shown in Figure 2 on page 9.

AERIAL SKETCH MAP SURVEY

During the last week in July the annual aerial survey was conducted over the major forest areas of the state. The areas that were mapped included; Stephens State Forest, Shimek State Forest, Yellow River State Forest, Loess Hills Pioneer State Forest, Waubonsie State Park, and the Amana Colonies forested area. The mapped area covers approximately 170,000 acres or 11% of the total forest area in the state. The aerial survey is intended to detect major pest problems of the forested areas, as well as give the forester of the particular area an idea of the forest condition.

The year of 1990 has been the second heaviest in rainfall as of July. This is a big change from previous years when lack of precipitation had put many of Iowa's forests under drought stress. With the heavy rainfalls this year, fewer cases of decline and death of forest trees were observed. Those that were observed could have been stressed in previous years and are now showing the results of those stresses.

With the heavy rainfalls, many foliage diseases were common because of spores being spread by the moisture. The anthracnoses were the most common this year especially on the sycamore, ash, and walnut. Heavy rainfalls have probably reduced the infections of oak wilt in forest stands because trees are healthier than in past years when they were stressed by drought and are more susceptible to the wilt disease.

The results and areas covered by the aerial sketch map survey are shown in tabular and graphical form in Table 1 (below) and in Figure 3 on page 10. A map of the areas covered by the aerial survey is shown in Figure 4 on page 11.

Table 1: Problems detected by the aerial sketch mapping.

A. Stephens State Forest
(Leroy,Lucas,Derby)
4 Oak wilt
1 Red pine decline
1 White pine decline
1 Dutch elm disease
7 Total

B. Stephens State Forest
(Olmitz-Weller)
7 Oak wilt
1 Red pine decline
8 Total

C. Shimek State Forest
(Lacey-Keosauqua)
4 Oak wilt
1 Dutch elm disease
1 Ash decline
6 Total

D. Shimek State Forest
(Farmington-Croton)
6 Oak wilt
1 Red pine decline
1 Dutch elm disease
1 Jack pine decline
9 Total

E. Loess Hills State Forest
2 Oak wilt
1 Ash decline
1 Fire damage
4 Total

F. Yellow River State Forest
2 Oak wilt
1 Red pine decline
1 Ash decline
4 Total

G. Waubonsie State Park
4 Oak wilt
2 Ash decline
6 Total

H. Amana Colonies
6 Oak wilt
1 Dutch elm disease
1 White oak decline
8 Total

MAJOR PEST PROBLEMS 1990

Iowa's forests were generally in good health this year except for a few annual problems that continue to trouble the forests. Heavy rainfalls earlier in the year eliminated the threat of drought stress and probably some of the pest conditions associated with the onset of drought stress to a tree. One drawback of the heavy rains in early spring was the increase in the usual foliar diseases. Anthracnose was more common and prolonged than in previous years when rainfall was less.

The vascular disease oak wilt, caused by the fungus *Ceratocystis fagacearum,* is one of the pest problems annually found in Iowa's forests. Red oaks are more susceptible than white oaks and may die within a month after infection. In the white oaks, a few branches may die each growing season for several years (U.S. Department of Agriculture, Forest Service 1979). Oak wilt is commonly found affecting trees in "pockets" or large groups of trees. This year, single tree infections were more common probably due to the high amounts of rainfall which reduced the drought stress of trees as seen in years past.

Dutch elm disease, another vascular disease caused by the fungus *Ceratocystis ulmi*, killed most of the large elms once common in the forests of Iowa. The disease killed most of the large overstory elms to the point where now elms are primarily an understory tree of the forests. Many of the remaining elms in the forests show symptoms that they had contracted the disease this year.

The decline of ash due to ash yellows remains another problem in the forest lands. The disease appears to be more common in eastern Iowa, but can be found in all parts of the state. The ash yellows study that was completed this summer will hopefully give the range and exactly how common the disease is throughout the state.

In late June, Brood XIII of the seventeen year periodical cicada emerged in several counties in eastern Iowa. The cicada nymphs emerged after spending seventeen years in the soil feeding on tree roots. The adults live for six weeks during which they mate and lay their eggs in tree twigs. The egg-laying or oviposition damage to large mature trees causes only moderate twig dieback. on younger trees, those below diameter breast height, the damage to the young twigs is much greater. Most of these

younger trees were killed because of the oviposition damage. The cicadas will lay eggs on several species but the oaks seem to be the preferred species of oviposition.

Environmental conditions put many forest trees under stress making them more susceptible to attack by other pests. In March, an ice storm in central Iowa damaged many trees. The faster growing tree species such as; silver maple, willows, ash, and cottonwood suffered the most damage. The weight of the ice caused many limbs to break on the trees. This opens the tree up to infection from disease which may lead to decline or death of these ice damaged trees.

Flooding due to heavy rainfalls in May and June caused many trees in low lying forest areas to die. Forested areas near the major rivers and drainage areas were under water in many places across the state for weeks. This flooding leaves the tree's root system unable to obtain the oxygen needed for survival. River bottom or floodplain species such as; silver maple, cottonwood, and green ash were primarily affected by the high water.

In the northeastern part of Iowa, winter injury was common on the arborvitae cedar and other conifer species. Winter injury occurs when warm dry winter winds cause transpiration of moisture from the foliage and it is unable to be replaced from the frozen ground. The winter injury was found on many trees planted in windbreaks as well as in forest stands. Approximately 1000 acres of forested land was affected by winter injury of which approximately 250 acres was killed.

There are many stands of pine within the states forested land and these pine stands have experienced many pest problems this year. These stands are composed of Scots, red , and white pine. Since pine is not native to Iowas forest's, it develops many problems if not intensively managed. Currently, the pine stands are overmature and overstocked. Conditions like these attract many pests.In past years, many pines have succumbed to the drought stresses and have died allowing the buildup of breeding grounds for the pine engraver *Ips pini,* and the red turpentine beetle *Dendroctonus valens*, The fungal diseases which affect these pine stands were not observed to be a major pest problem and were at normal levels.

LITERATURE CITED

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Sinclair, W.A. 1986. Ash yellows. Unpublished paper. Department of Plant Pathology, Cornell University, Ithaca, New York 14853.

U.S. Department of Agriculture, Forest Service. 1979. A guide to common insects and diseases of forest trees in the northeastern United States. Northeast. Area State Priv. For., For. Insect and Disease Management., Broomall, PA. p. 123, illus.

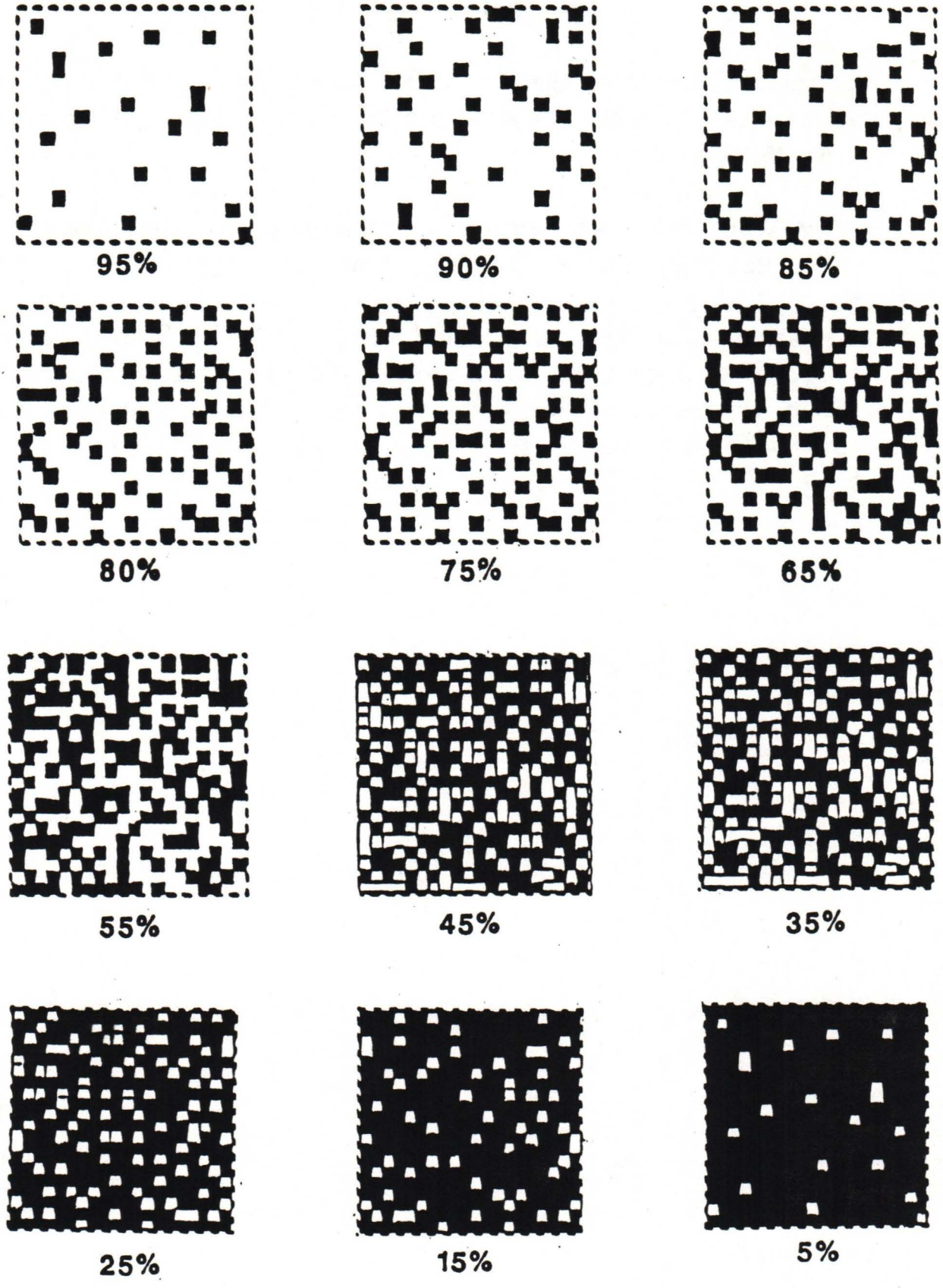

FIGURE 1: CROWN TRANSPARENCY CHART

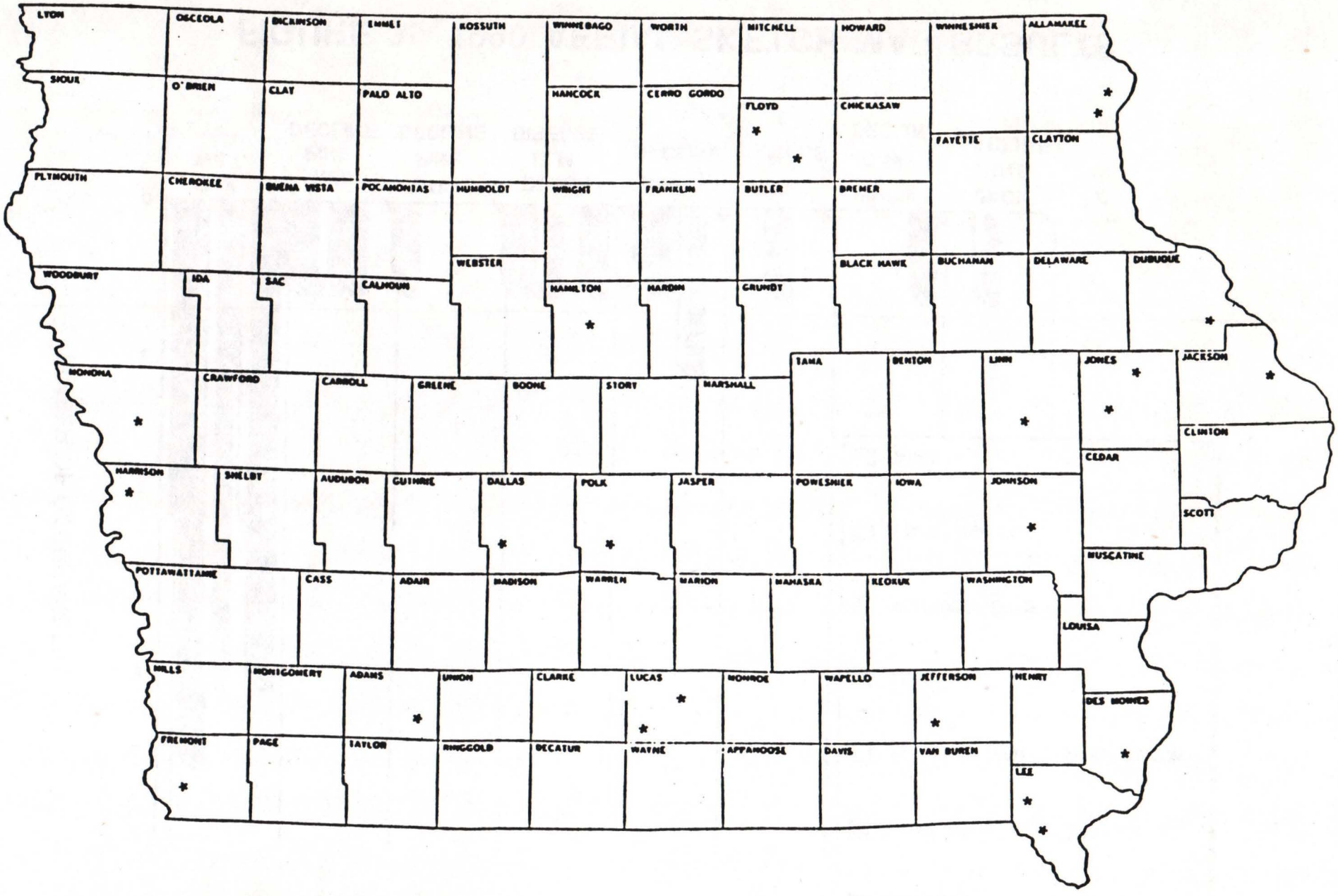

FIGURE 2: AREAS COVERED BY THE 1990 ASH YELLOWS SURVEY

*** REPRESENTS ONE ASH YELLOWS SURVEY SITE**

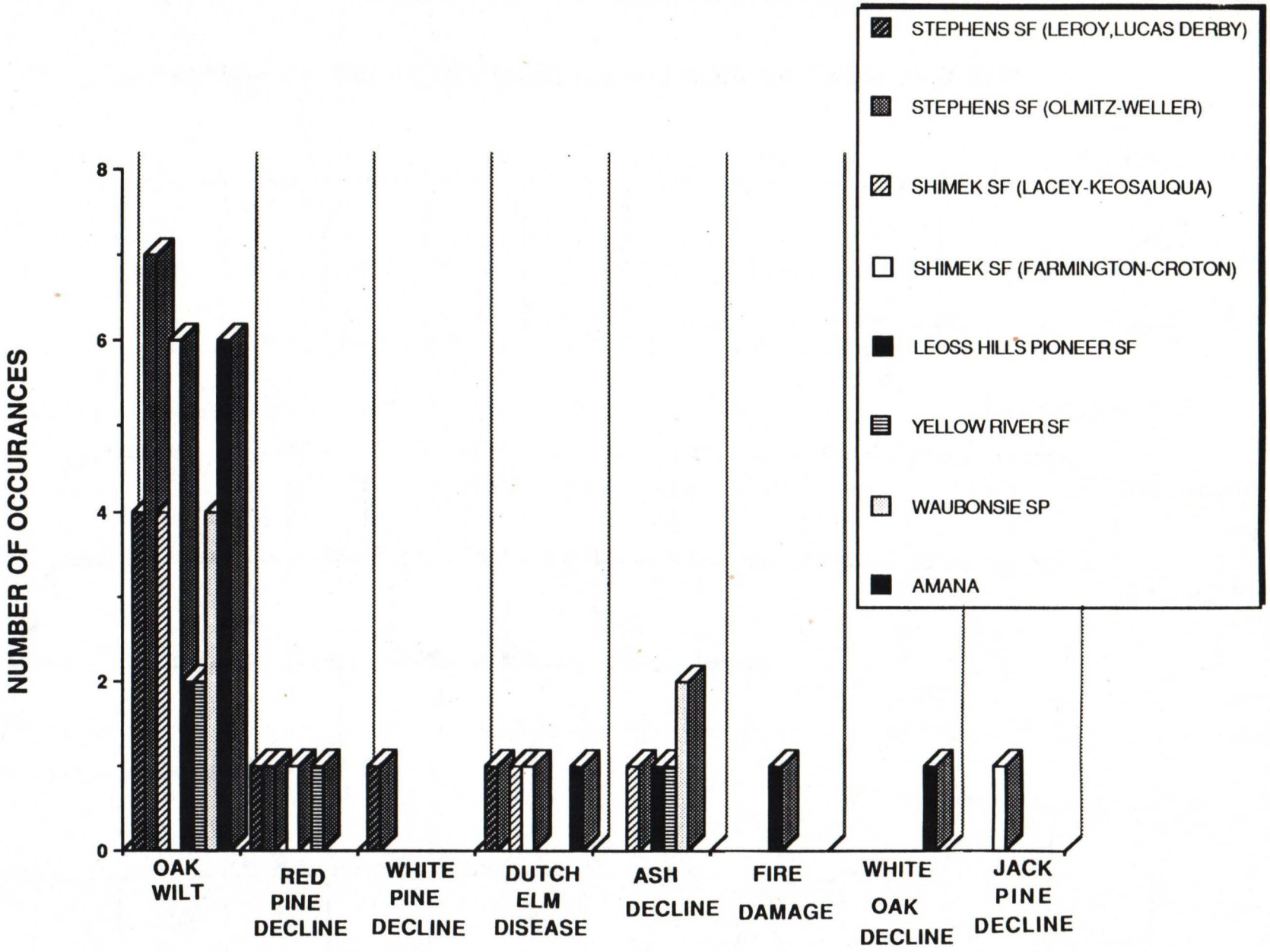

FIGURE 3: 1990 AERIAL SKETCH MAP RESULTS

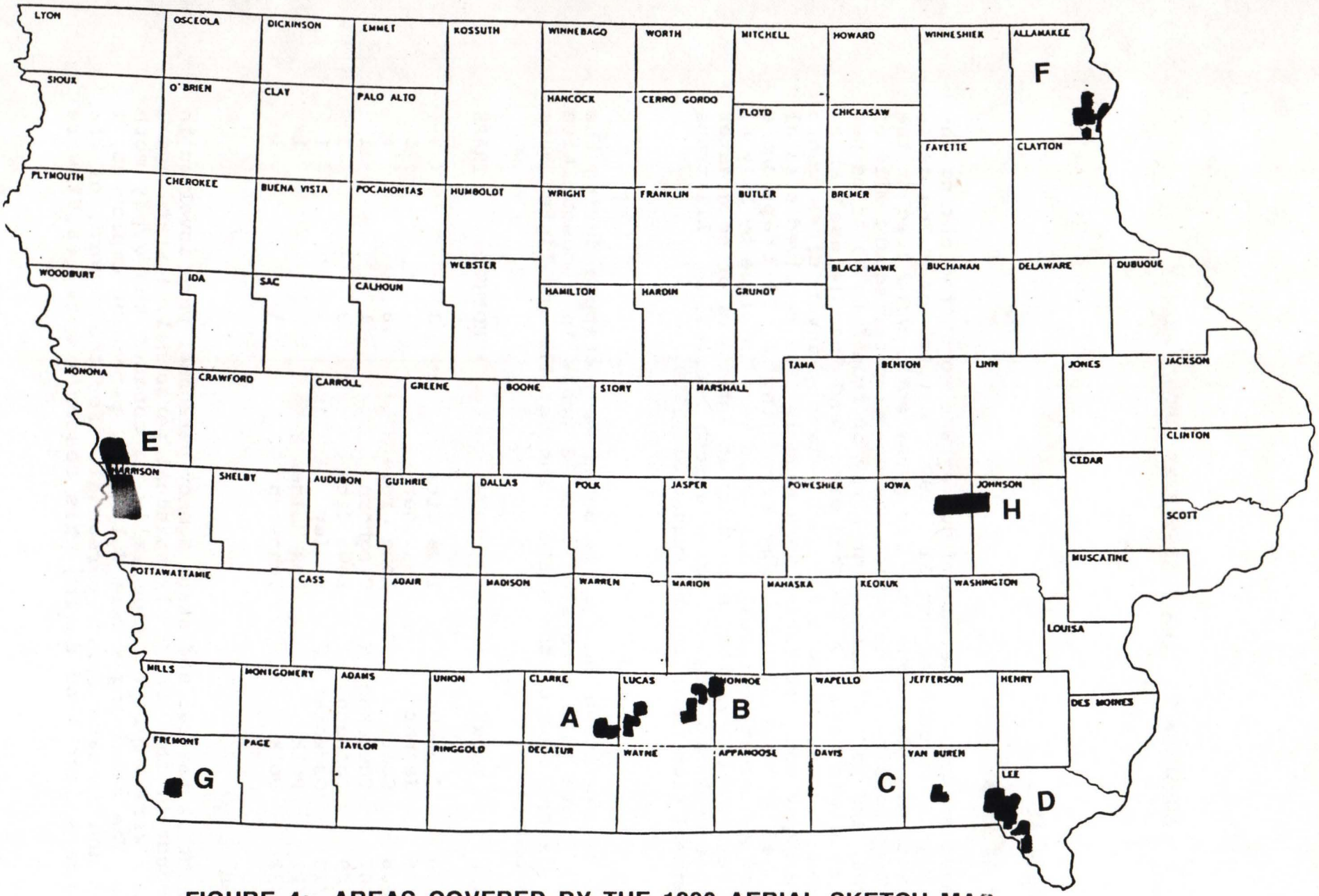

FIGURE 4: AREAS COVERED BY THE 1990 AERIAL SKETCH MAP

A. Stephens State Forest (Leroy,Lucas,Derby)
B. Stephens State Forest (Olmitz-Weller)
C. Shimek State Forest (Lacey-Keosauqua)
D. Shimek State Forest (Farmington-Croton)
E. Loess Hills Pioneer State Forest
F. Yellow River State Forest
G. Waubonsie State Park
H. Amana Colonies

ADDENDUM TO IOWA FOREST PEST SURVEY REPORT

1990

GYPSY MOTH 1990

Summary of Work

The annual statewide, detection survey was conducted during the period May 21 through August 31, 1990. A total of 2,760 delta traps, with the pheromone lure for gypsy moth, were used in the work. Trap density for detection was one trap per square mile of host area, and for delimiting, an array of from 5 to 20 traps per square mile was used. All urban areas and "people use" areas with host vegetation were trapped. Twenty-seven sites where positive gypsy moth recoveries were made in 1989 received a total of 345 delimiting traps. The remaining 2,415 traps were installed as detection traps. All traps were in place by July 6, 1990. Personnel revisited each trap at intervals of no greater than three weeks to inspect for male moth recoveries. All traps were removed from the sites by August 31, 1990.

Results

A total of seventeen male gypsy moths were trapped during the season. These were recovered from 12 traps in 6 communities within six counties of the state. The details are listed here for the record.

DATE	COUNTY	TOWN	# MOTHS	TRAPS
7/26	Johnson	Iowa City	3	3
7/26	Jasper	Reasoner	1	1
8/06	Scott	Long Grove	6	1
8/07	Cherokee	Cleghorn	1	1
8/09	Johnson	Iowa City	3	3
8/13	Osceola	Sibley	1	1
8/21	Polk	Des Moines	1	1
8/22	Polk	Johnston	1	1

Comments

A total of 12 federal and state agency personnel were involved in the conduct of the work. Six seasonal personnel, 4 state and 2 federal, were employed especially to conduct the gypsy moth survey. The remaining 6 were full-time, permanent employees, 1 federal and 5 state agency personnel. For the record, of the total traps installed during this season's work, 68.9% were

managed by state personnel, and 31.1% by federal personnel. The bulk of the work was conducted by employees of the Iowa Department of Agriculture and Land Stewardship, and the US Dept. of Agriculture, APHIS, PPQ. Assistance with planning and coordination was obtained from the Iowa Dept. of Natural Resources, Forestry personnel. ISU Extension personnel cooperated with information dissemination.

Discussion

Several points concerning the work this season are worthy of discussion. First it should be noted that no gypsy moths were recovered from any location where positive recoveries were identified during the 1989 survey. This implies that all moths recovered in the 1989 season were probably "hitchhikers". Second, 1990 was the second consecutive negative season in the City of Clinton. This implies that controls applied in the spring of 1989 very likely eliminated the spot infestation that had exited in the southwest corner of that city.

All positive recoveries are cause for concern, and it is understood that additional delimiting efforts will be conducted at each of the 1990 positive recovery sites. However, the recoveries in two communities are cause for particular concern this year. In Iowa City, the catch dates, locations, and condition of the specimens when recovered, imply that a developing infestation is likely there. Special attention will be given to the delimiting work there.

At Long Grove the 6 moths from a single trap alerted field personnel who revisited the site at the earliest opportunity following confirmation of the specimens. Contact with residents lead to the discovery that a family from a heavily infested area in New Jersey had moved into the community on April 8, 1990. Contact with that family revealed that during the 3rd week of April, while the boat trailer they had brought with them was in the garage, they suddenly found "hundreds of tiny worms" in the garage. They immediately fumigated the garage with a "bug bomb" and got rid of the "worms". The personnel who were investigating the incident obtained permission to inspect the outdoor equipment at the residence. The inspection revealed a total of 53 spent egg masses on the boat trailer and on a piece of wood. Since at least 6 of the "worms" escaped the "bug-bombing" it is logical to assume that others did also. For this reason special attention will be devoted to a delimited survey in that community during the 1991 season.

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September 17, 1990

SUMMARY - DISTRICT PEST CONDITIONS
JULY - AUGUST

The major problems appearing in several of the Forest Districts during July through August were as follows.

1. Oak wilt - medium to heavy severity in some areas, other parts of the state tended to remain endemic.

2. Fall webworm appeared in several districts with low to medium severity.

3. Walnut caterpillar in most all of the districts from extremes of light to heavy severity.

4. Anthracnose continued into the last half of the summer season.

All districts had several problems but minor in nature. The overall pest picture for 1990 was not threatening to the Iowa Forest Resource.

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